



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/712,190	11/15/2000	Woong-Kwon Kim	3430-0138P	8112

2292 7590 01/28/2002

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

NGUYEN, HOAN C

ART UNIT PAPER NUMBER

2871

DATE MAILED: 01/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/712,190

Applicant(s)

KIM, WOONG-KWON

Examiner

HOAN C. NGUYEN

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment on 11-15-2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 11-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 15-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Applicant has cancelled claims 11-14; therefore, only claims 1-10 and 15-27 are still pending.

Applicant's arguments with respect to claims 1-10 and 15-27 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the cited feature "the TFT includes an etch stopper formed on the doped amorphous silicon layer and between the source and drain electrodes" in claim 17 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Fig. 4 shows an etch stopper ES formed on the amorphous silicon layer 104a.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the cited feature "an

Art Unit: 2871

interlayer insulator formed entirely over the substrate, having a first and a second contact holes which respectively expose a portion of source and drain regions therebelow, wherein the source and drain electrodes are formed on the interlayer insulator to respectively contact the source and drain regions" in claim 19 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

1. Claims 15, 16 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Guehler et al. (US6221543B1).

With respected to claims 15 and 16, Guehler et al. (Fig. 2b, col. 5, lines 23-26) disclose a liquid crystal display device (LCD) comprising:

- a thin film transistor (TFT) 20 formed on a substrate 10a, including a gate electrode 22, a source electrode 24 and a drain electrode; wherein according to claim 16, it is a conventional prior art that TFT 20 further includes a semiconductor layer formed on the gate insulating layer, having an amorphous silicon layer and a doped amorphous silicon player.
- a color filter layer R/G/B overlapping the drain electrodes 26 for electrical connection between drain electrodes and pixel electrode 12;
- a planarization layer 16 formed on the TFT and on the color filter;
- pixel electrode 12 formed on the planarization layer 16 and electrical contacting the drain electrode ;

With respected to claim 22, Guehler et al. (Fig. 2) disclose the method of manufacturing a LCD comprising steps:

- providing a substrate 10a;
- forming a thin film transistor (TFT) 20 formed on a substrate 10a, including a gate electrode 22, a source electrode 24 and a drain electrode;
- forming a color filter layer R/G/B overlapping the drain electrodes 26 for electrical connection between drain electrodes and pixel electrode 12;
- forming a planarization layer 16 formed on the TFT and on the color filter; the planarization layer including a drain contact hole 28;

- forming a pixel electrode 12 formed on the planarization layer 16 and electrical contacting the drain electrode via the drain contact hole 28;

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1-3 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guehler et al. (US6221543B1) in view of Zhong et al. (US5994721A).

With respect to claims 1-3, Guehler et al. (Fig. 2b, col. 5, lines 23-26) disclose a liquid crystal display device (LCD) comprising:

- a substrate 10a
- a gate electrode 22 over the substrate;
- a semiconductor layer 20 aligned with a gate electrode 22, it is a conventional prior art that TFT 20 further includes a semiconductor layer formed on the gate insulating layer, a source electrode 24 and a drain electrode electrically connected with the semiconductor layer;
- a color filter layer R/G/B on and in direct contact with the drain electrodes 26;
- a planarization layer 16 formed on the TFT and on the color filter;
- pixel electrode 12 formed on the planarization layer 16 and electrical contacting the drain electrode.

With respect to claim 6-8, Guehler et al. (Fig. 2b, col. 5, lines 23-26) disclose a method of forming liquid crystal display device (LCD) comprising:

- providing a substrate 10a;
- forming a gate electrode 22 over substrate;
- forming an insulation layer on the gate electrode and the substrate as conventional prior art.
- forming a conventional art thin film transistor (TFT) 20 wherein forming semiconductor layer, aligned relative to the gate electrode on a insulating layer, forming gate electrode 22, a source electrode 24 and a drain electrode;
- forming a color filter layer R/G/B on and in direct contact with the drain electrodes 26;
- forming a planarization layer 16 formed on the TFT and on the color filter; the planarization layer including a drain contact hole 28;
- forming a pixel electrode 12 formed on the planarization layer 16 and electrical contacting the drain electrode via the drain contact hole 28;

However, Guehler et al. do not teach of forming a color filter layer R/G/B on and in direct contact with the source electrode.

Zhong et al. (Fig. 6c) disclose forming a color filter layer 101 on and in direct contact with the drain and source electrodes for preventing light leakage.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Guehler et al.

Art Unit: 2871

disclosed with a color filter layer 101 on and in direct contact with the drain and source electrodes for preventing light leakage.

3. Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guehler et al. (US6221543B1) in view of Zhong et al. (US5994721A) as applied to claims 1 and 6 above, and further in view of Kashiwazaki et al. (US6162510).

Kashiwazaki discloses (Figs. 6C-F) the conventional TFT including:

- forming a first layer/a semiconductor layer 104 on gate insulating layer 1-3;
- forming etch stopper layer 105, the doped semiconductor layer 106 covering the semiconductor layer and the etch stopper layer;
- forming second layer/passivation film 110 over the first layer and the etch stop layer;

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Guehler et al. disclosed with the conventional TFT having the etch stop layer for preventing first layer made of semiconductor from being etched.

4. Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guehler et al. (US6221543B1) in view of Zhong et al. (US5994721A) as applied to claims 1 and 6 above, and further in view of Murade (US6297862B1).

Murade (Figs. 3a-4d) discloses the LCD device comprising light shielding layer 7 formed between the substrate 10 and TFT and an insulating layer 11 covering the light shielding layer 7.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Guehler et al. disclosed with (a) the light shield below TFT for protecting TFT from incident light.

5. Claims 16, 17, 21, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guehler et al. (US6221543B1) as applied to claims 15 and 22, in view of Kashiwazaki et al. (US6162510).

Kashiwazaki discloses (Figs. 6C-F) the TFT including:

- forming a gate electrode 102;
- forming a gate insulating layer 103;
- depositing a semiconductor layer 104 on gate insulating layer;
- patterning the semiconductor layer to form an active layer made of amorphous silicon (claim 25);
- forming etch stopper layer 105, the doped semiconductor layer 106 covering the semiconductor layer and the etch stopper layer;
- forming the source and drain electrodes 107/108 on the doped semiconductor layer with etching a portion of the doped semiconductor layer between the source and drain electrodes to form a channel region (claim 21);

Art Unit: 2871

- etching a portion of the doped semiconductor layer between the source and drain electrodes.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Guehler et al. disclosed with the conventional TFT having the etch stop layer for preventing first layer made of semiconductor from being etched.

6. Claims 18, 19, 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guehler et al. (US6221543B1) as applied to claims 15 and 22, in view of Murade (US6297862B1).

With respected to claims 18 and 24, Murade (Figs. 3a-4d) discloses the LCD device comprising light shielding layer 7 formed between the substrate 10 and TFT and an insulating layer 11 covering the light shielding layer 7.

With respected to claims 19 and 20, Murade (Figs. 3a-4d) discloses the LCD device, wherein the TFT further includes:

- a poly-silicon active layer 1 having source and drain region at the end portions thereof;
- a gate insulating layer 12 on a central portion of the active layer, the gate electrode 2 being formed on the gate insulating layer;
- an inner layer insulator 13 formed entirely over the substrate, having a first and a second contact hole which respectively expose a portion of source and drain regions 1a/1b therebelow, wherein the source and drain electrodes are

formed on the interlayer insulator to respectively contact the source and drain regions.

With respected to claim 20, Murade (Figs. 3a-4d) discloses the LCD device, wherein the active layer 1 is made of poly-silicon for less light sensitive thus the LCD device could be used in presence of a large quantity of light [the other reference of Sato et al. (US6327006B1) also applies to same feature].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Guehler et al. disclosed with (a) the light shield below TFT for protecting TFT, (b) the active layer 1 is made of poly-silicon for less light sensitive thus the LCD device could be used in presence of a large quantity of light.

7. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guehler et al. (US6221543B1) as applied to claims 15 and 22, in view of Ohkubo et al. (US6166786A).

Ohkubo et al. (Figs. 3a-e) disclose the method of manufacturing a LCD, wherein forming the TFT includes:

- forming a semiconductor 10 made of polysilicon film (col. 5, line 35);
- forming a gate insulating layer 15, a with of the gate insulating layer being smaller than that of the semiconductor layer for ion-doped on the semiconductor (col. 39-51);
- forming a gate electrode 16 on the gate insulating layer;

Art Unit: 2871

- ion-doped and exposed portion of semiconductor layer to define source and drain regions;
- forming an interlayer insulator 31 (Fig. 12) entirely over the substrate, the interlayer including a source region contact hole to expose a portion electrode therebelow, and a drain region contact hole to expose a portion of the drain electrode therebelow;
- forming source and drain electrodes to be in electrical contact with the source and drain regions.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Guehler et al. disclosed with manufacturing the conventional polysilicon-TFT, wherein (a) forming a gate insulating layer, a with of the gate insulating layer being smaller than that of the semiconductor layer for ion-doped on the semiconductor, (b) a semiconductor 10 made of polysilicon film for low temperature manufacturing.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (703)306-0472. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, SIKES L WILLIAM can be reached on (703)308-4842. The fax phone

Application/Control Number: 09/712,190

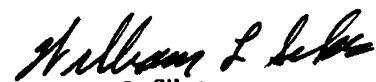
Art Unit: 2871

numbers for the organization where this application or proceeding is assigned are (703)746-8178 for regular communications and (703)308-5841 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0530.

HOAN C. NGUYEN
Examiner
Art Unit 2871

chn
January 23, 2002


William L. Sikes
Supervisory Patent Examiner
Technology Center 2800